



Open Systems Development Initiative (OSDI)
Open Systems Project Engineering Conference (OSPEC)
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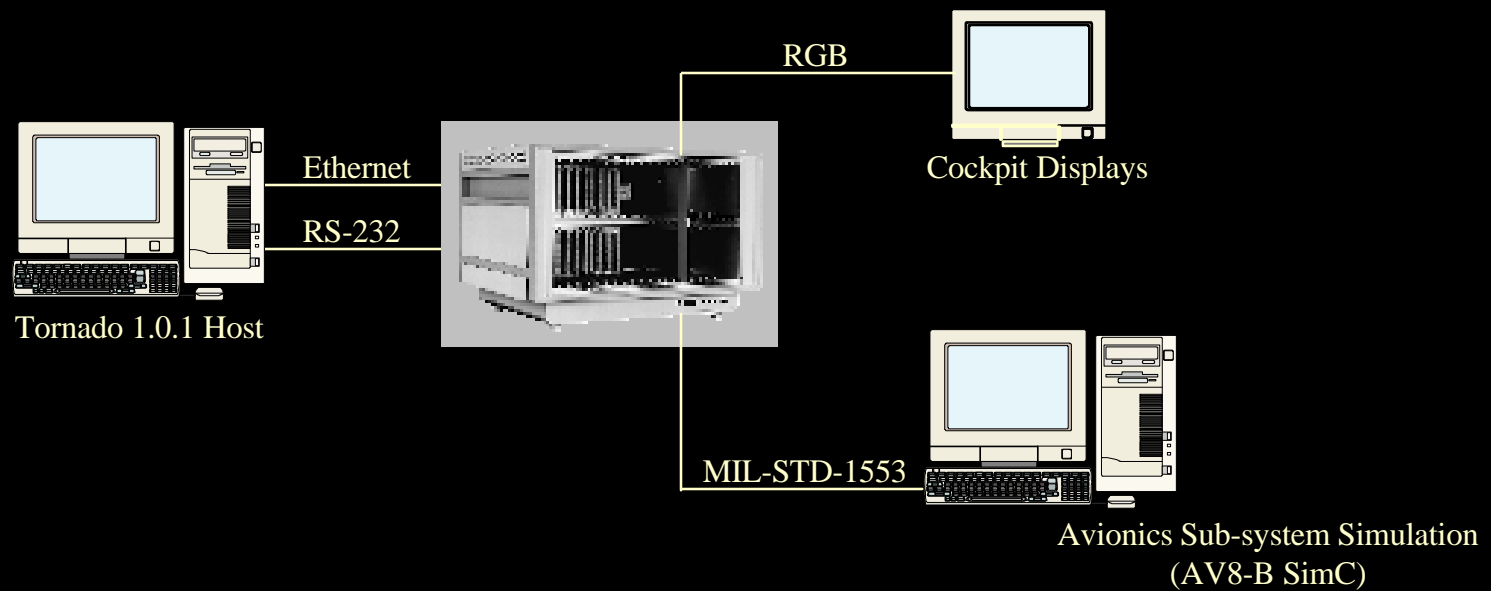
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Open Systems Development Initiative



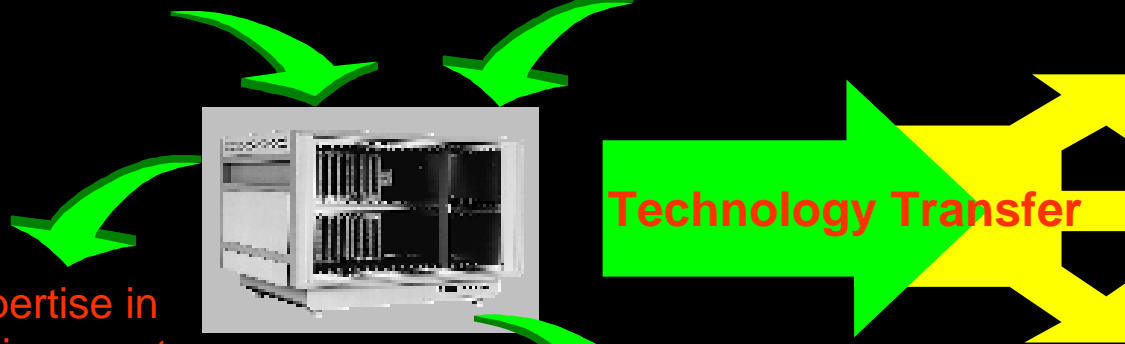


Goals

COTS technology

Object Oriented S/W

AV8B OSCAR



Technology Transfer

F/A-18 AMC&D

OTHERS

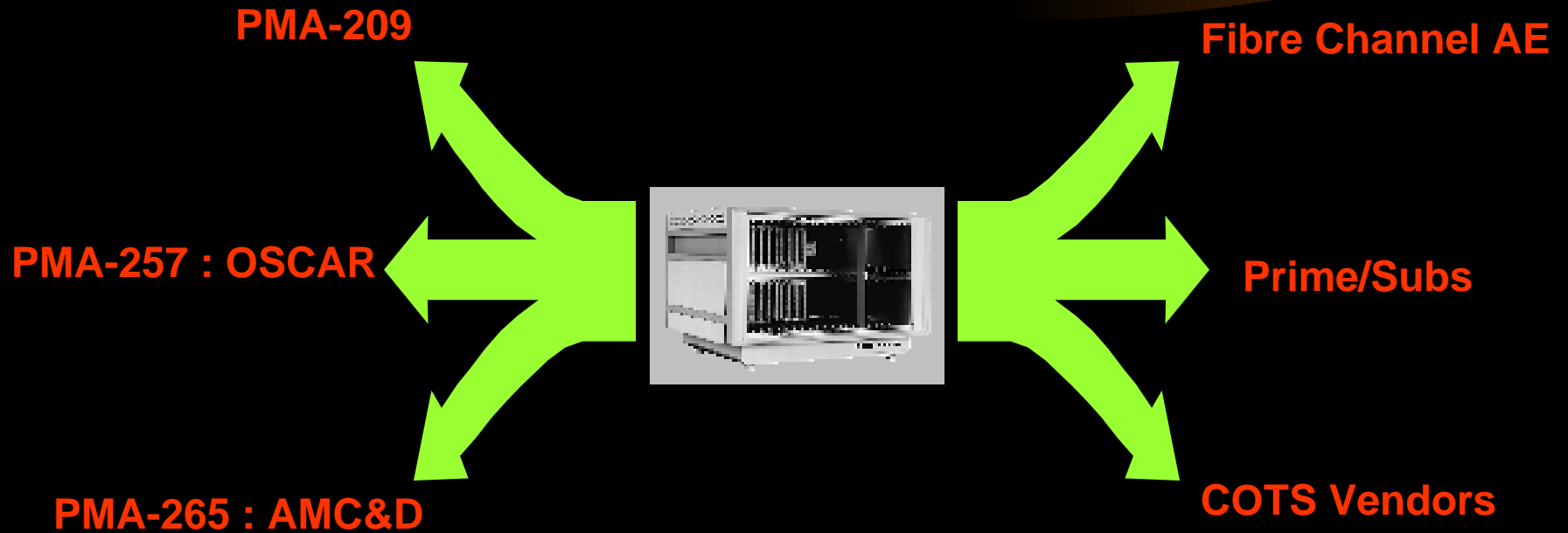
Hands-on expertise in a low risk environment

Plug & Play capabilities
Performance Characteristics

In-house OS expertise



OSDI Relationships



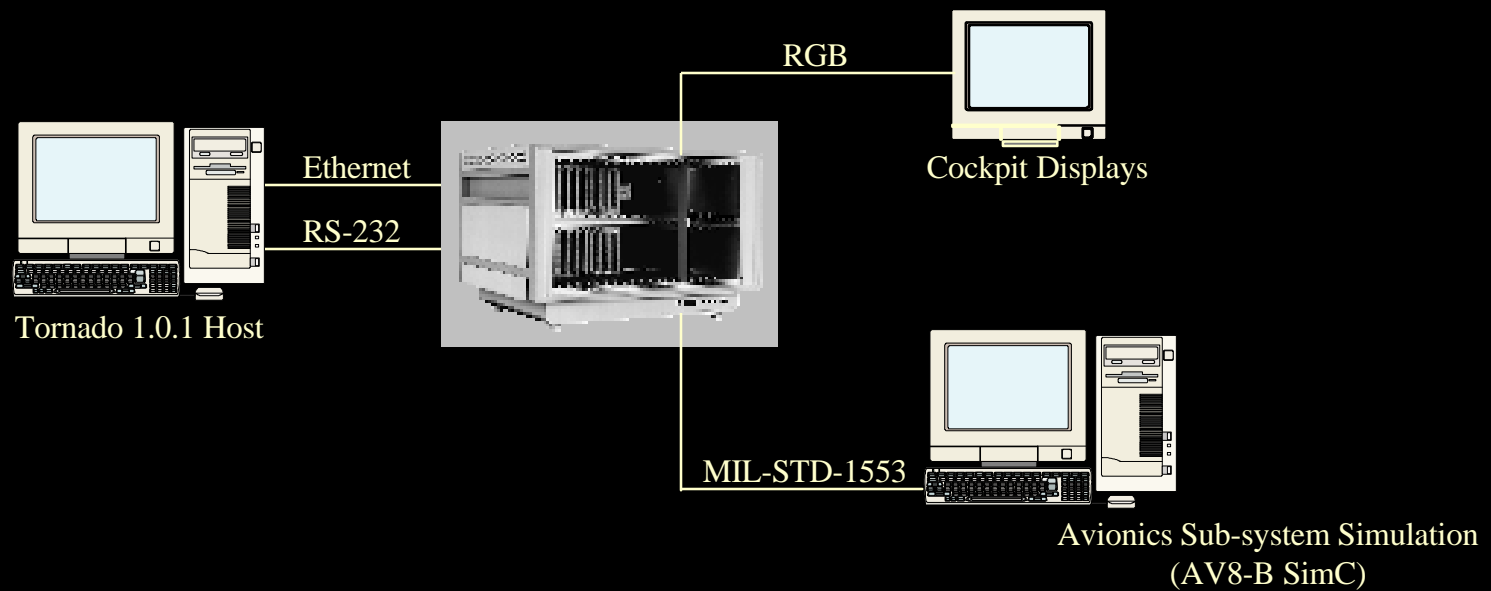


Architecture

- Operational Architecture - Description of the operational elements, assigned tasks, and information flows.
- Systems Architecture - Defines the physical connection, location and identification of key components, circuits, networks etc., and specifies system and component performance parameters.
- Technical Architecture - Identifies the services, interfaces, standards, and their relationships.

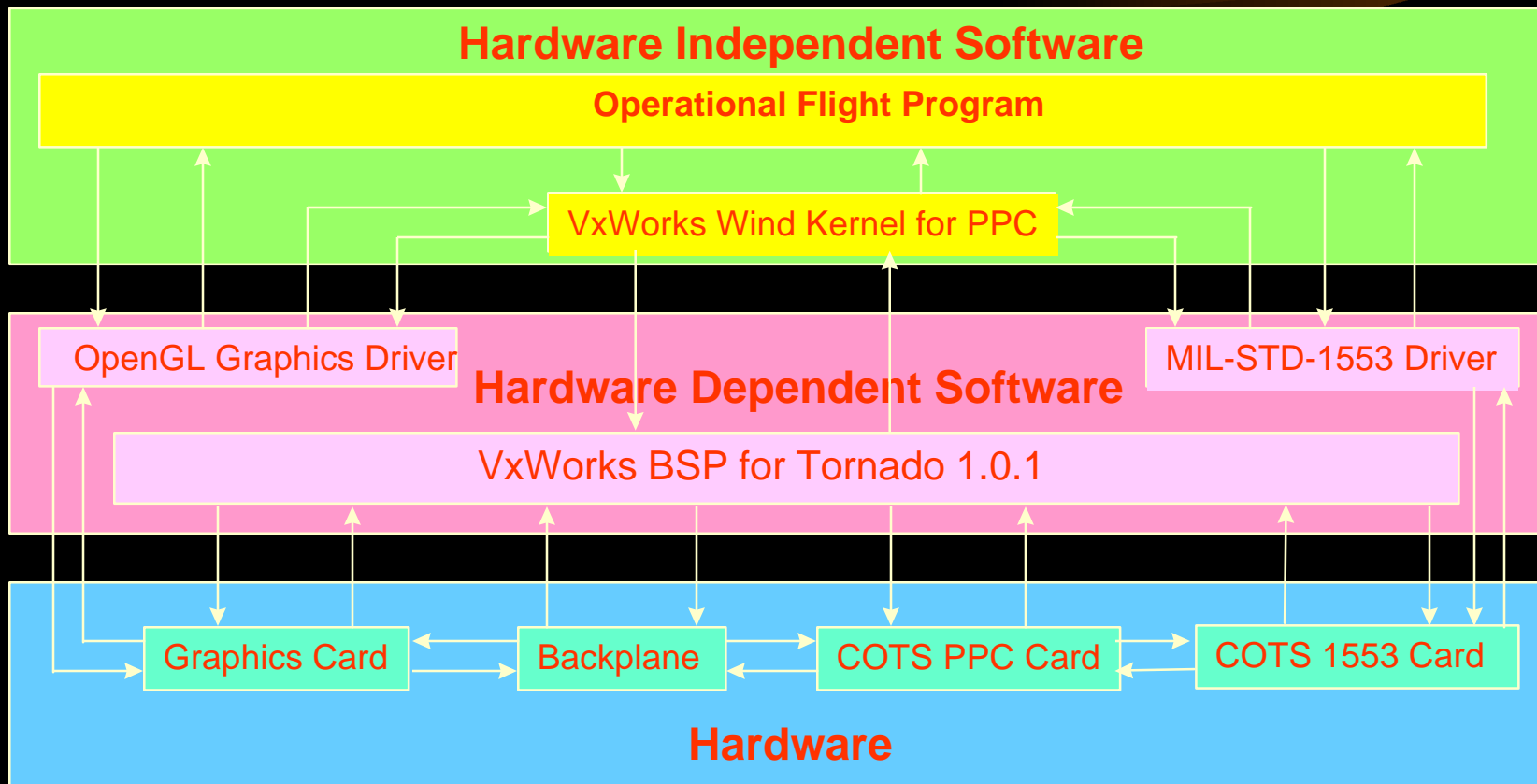


OSDI System Architecture



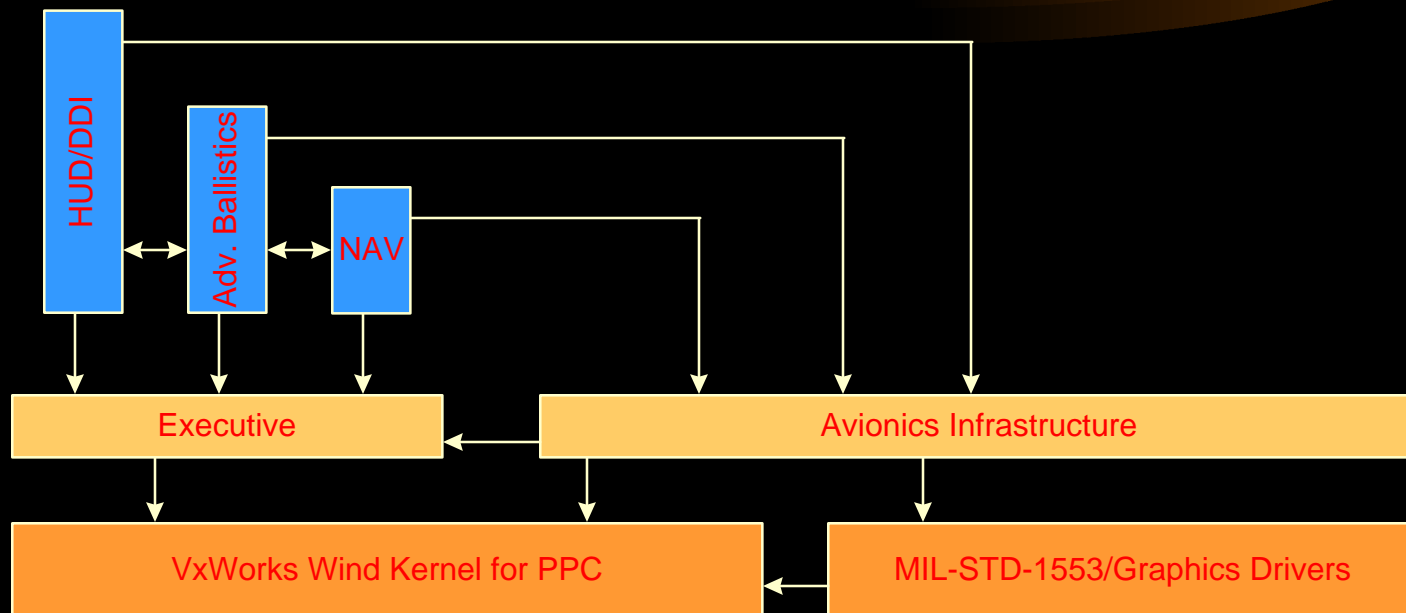


OSDI Technical Architecture



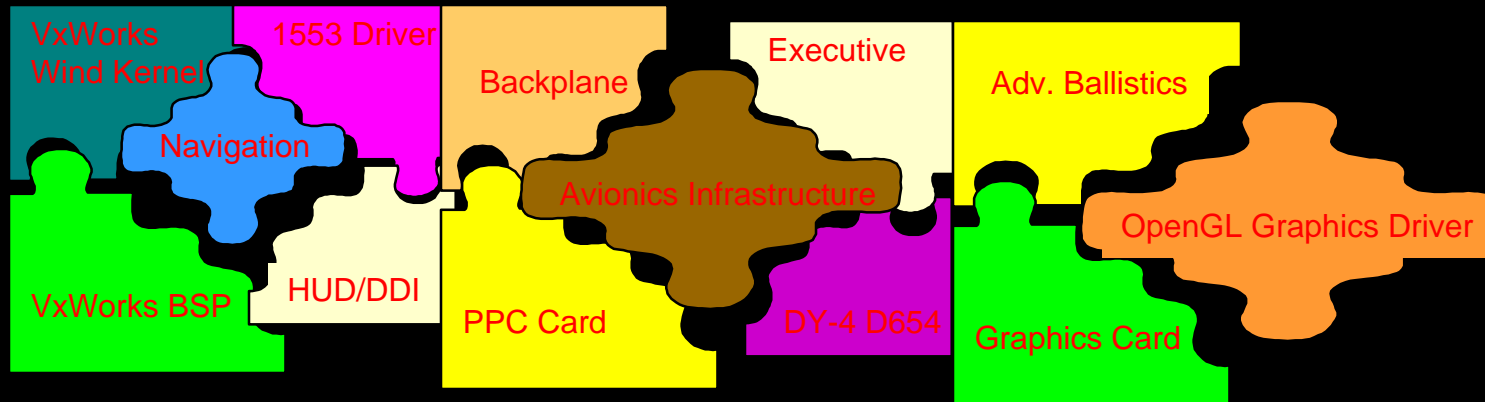


OSDI S/W Architecture





OSDI Components





Standards & Conformance

Standards

- National Body
- Company Proprietary
- Non-Standard
- Implementation

Conformance

- Strict
- Conforming
- Conforming with extensions
- Non-conforming



Identify Interfaces

	VxWorks Kernel	VxWorks BSP	1553 Driver	Backplane	DY-4 SVME-171	DY-4 D654	Executive	Avionics Infr.	Navigation	Adv. Ballistics	HUD/DDI	Graphics Card	Graphics Driver
VxWorks Kernel		X	X				X	X					X
VxWorks BSP	X			X	X	X							
1553 Driver	X							X					
Backplane		X			X							X	
DY-4 SVME-171		X		X		X							
DY-4 D654		X			X								
Executive	X							X	X	X	X		
Avionics Infr.	X		X				X		X	X	X		X
Navigation							X	X		X			
Adv. Ballistics							X	X	X		X		
HUD/DDI							X	X		X			
Graphics Card				X									X
Graphics Driver	X							X				X	



Identify Key Interfaces

	VxWorks Kernel	VxWorks BSP	1553 Driver	Backplane	DY-4 SVME-171	DY-4 D654	Executive	Avionics Infr.	Navigation	Adv. Ballistics	HUD/DDI	Graphics Card	Graphics Driver
VxWorks Kernel		X(1)	X(2)				X(3)	X					X
VxWorks BSP				X(4)	X(5)	X							
1553 Driver								X(6)					
Backplane					X(7)							X(8)	
DY-4 SVME-171						X(9)							
DY-4 D654													
Executive								X(10)	X(11)	X(12)	X(13)		
Avionics Infr.									X(14)	X(15)	X(16)		X(17)
Navigation										X(18)			
Adv. Ballistics											X(19)		
HUD/DDI													
Graphics Card													X
Graphics Driver													



Key Open Standard Interfaces

	VxWorks Kernel	VxWorks BSP	1553 Driver	Backplane	DY-4 SVME-171	DY-4 D654	Executive	Avionics Infr.	Navigation	Adv. Ballistics	HUD/DDI	Graphics Card	Graphics Driver
VxWorks Kernel		X(1)	POSIX				POSIX	X					X
VxWorks BSP				VME	EABI	X							
1553 Driver								X(6)					
Backplane					VME							VME	
DY-4 SVME-171						MaxPack							
DY-4 D654													
Executive								X(10)	X(11)	X(12)	X(13)		
Avionics Infr.									X(14)	X(15)	X(16)		OpenGL
Navigation										X(18)			
Adv. Ballistics											X(19)		
HUD/DDI													
Graphics Card													X
Graphics Driver													



The KOSI List

	KOSI Component	Standard/Non-Standard	Conformance Level	Responsibility
X(1)	VxWorks Kernel - VxWorks BSP	Non-Standard		DY-4
X(2)	VxWorks Kernel - 1553 Driver	POSIX	IEEE Strict	DY-4
X(3)	VxWorks Kernel - OFP Executive	POSIX	IEEE Strict	OSDI/DY-4
X(4)	VxWorks BSP - Backplane	1101.2 VME	IEEE Strict	DY-4
X(5)	VxWorks BSP - DY-4 SVME-171	EABI	ANSI Strict	DY-4
X(6)	1553 Driver - Avionics Infrastructure	Non-Standard		???
X(7)	Backplane - DY-4 SVME-171	1101.2 VME	IEEE Strict	DY-4
X(8)	Graphics Card - Backplane	1101.2 VME	IEEE Strict	Radstone
X(9)	DY-4 SVME-171 - D654	MaxPack	Proprietary/Unknown	DY-4
X(10)	OFP Executive - Avionics Infrastructure	.h(implementation)		OSDI
X(11)	OFP Executive - Navigation	.h (implementation)		OSDI
X(12)	OFP Executive - Advanced Ballistics	.h (implementation)		OSDI
X(13)	OFP Executive - HUD/DDI	.h (implementation)		OSDI



The KOSI List

	KOSI Item	Standard/Non-Standard	Conformance Level	Responsibility
X(14)	Avionics Infrastructure - Navigation	.h (implementation)		OSDI
X(15)	Avionics Infrastructure - Adv. Ballist.	.h (implementation)		OSDI
X(16)	Avionics Infrastructure - HUD/DDI	.h (implementation)		OSDI
X(17)	Avionics Infrastructure - Graphics Drv	OpenGL	ANSI Strict	Radstone
X(18)	Navigation - Advanced Ballistics	BANav.h(impl.)		OSDI
X(19)	Advanced Ballistics - HUD/DDI	.h (implementation)		OSDI

Note: Header files are facades(a design pattern) that define critical software interfaces.



Benefits of KOSI Analysis

- Understand key interfaces & standards
- Non-conforming interfaces
- Standardization Vs. Optimization
- KOSI based product selection
- Valuable tool for system engineers



Benefits of KOSI Analysis

- Promotes technology insertion for increased throughput and memory requirements
- Reduced time-to-market
- KOSI based system is scalable, portable, interoperable, & plug & play compatible
- System kept “open” indefinitely

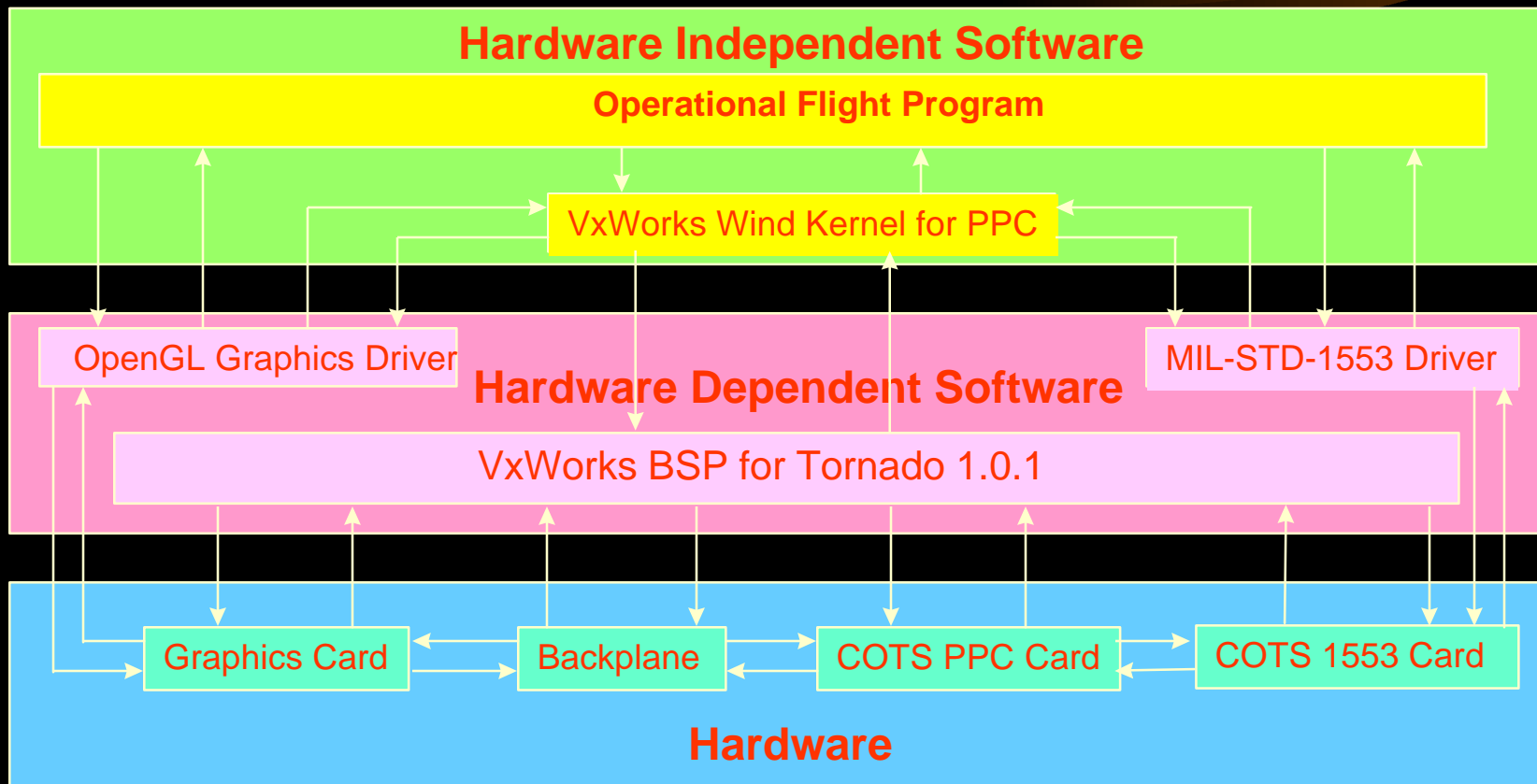


Recommendation #1

- Every new open system procured for the DoD shall have KOSI analysis as a SOW requirement
- KOSI analysis shall be performed by a joint team of prime, subs and DoD
- KOSI analysis shall be controlled and changes tracked through the life of the system

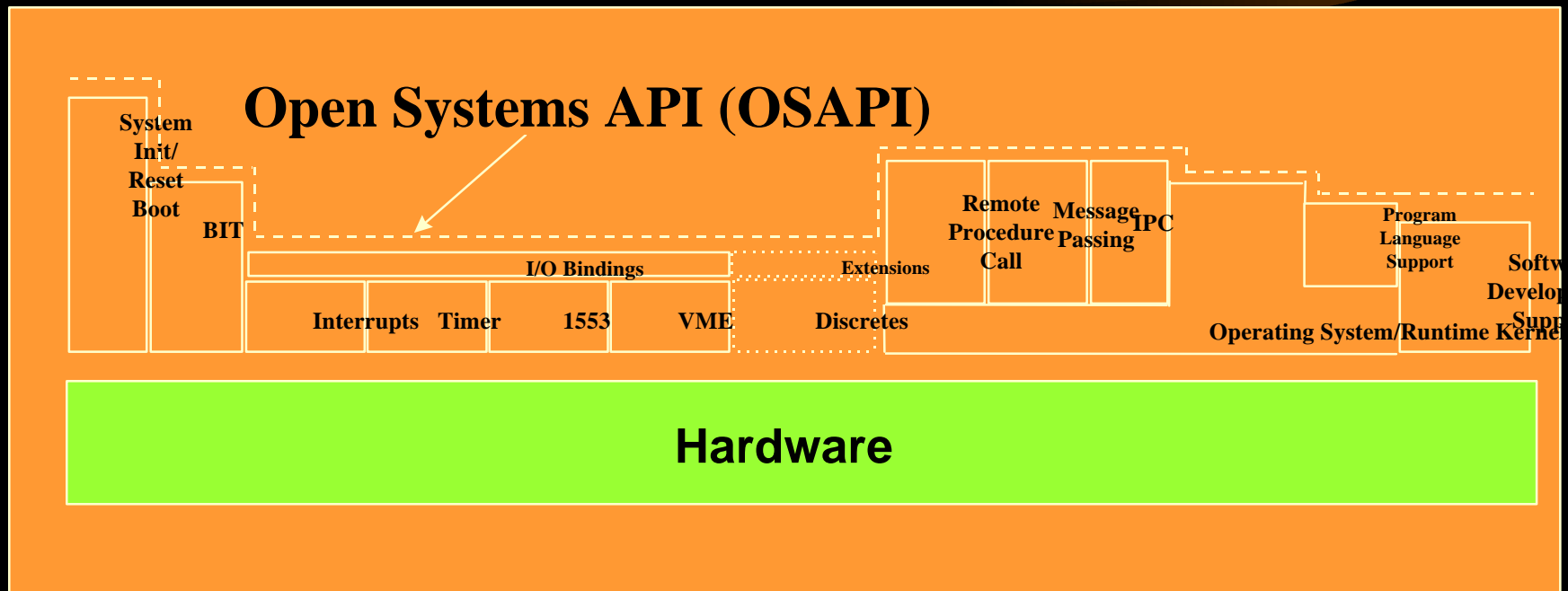


OSDI Technical Architecture





Typical OS Technical Architecture



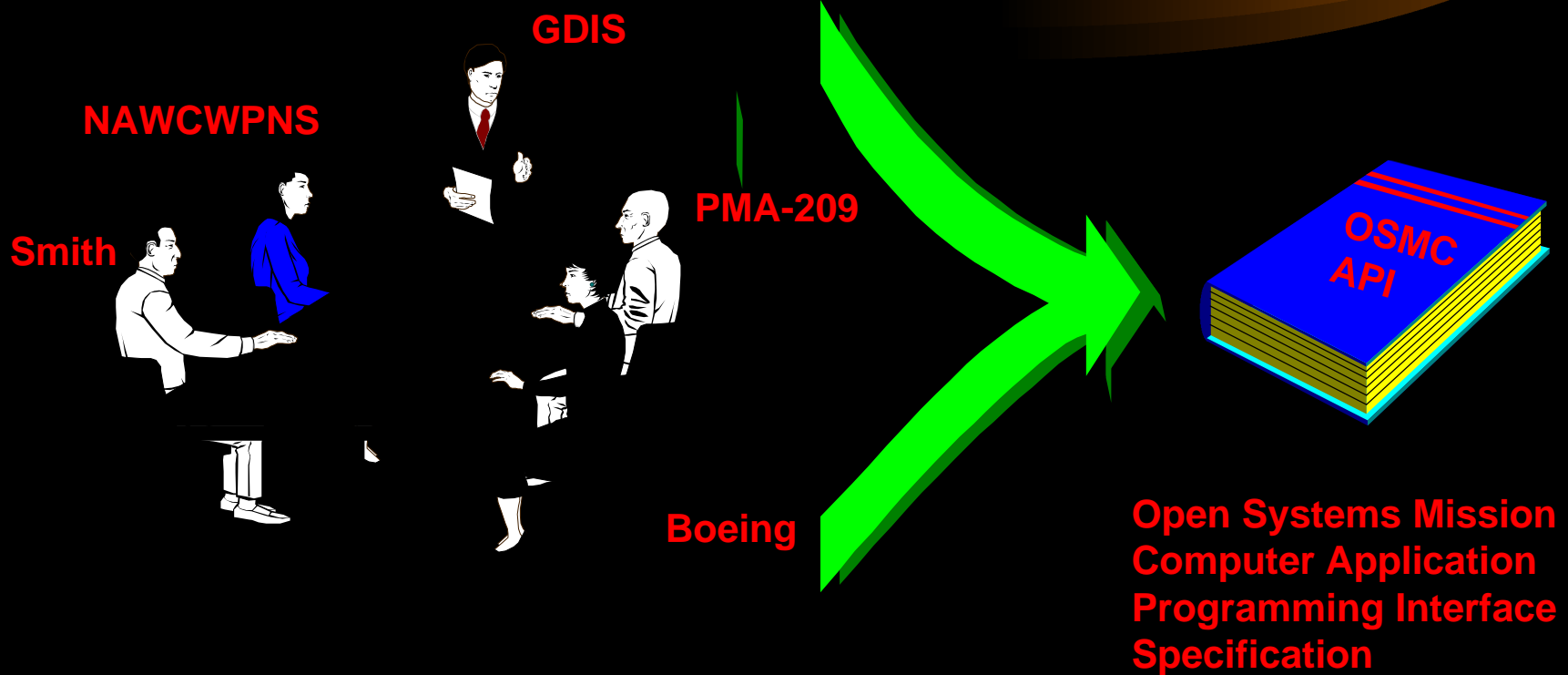


Generic API Services

- System Initialization & Boot Loader
- Built-In Test (BIT)
- Device Drivers
 - Interrupt
 - Timers
 - Backplane (VME)
 - Legacy I/O (1553)
 - High Speed I/O (Fibre Channel, PCI, SCI)
 - Discrete I/O
 - Bindings
- Operating system/Kernel
- Programming Language Runtime Support
- Software Development Interface



OSMC API - A Joint Venture





Recommendation #2

- Joint Review of OSMC API
- Develop OSAPI Specification
- Encourage vendors to voluntarily embrace OSAPI
- Validate COTS product conformance to OSAPI



Questions

It Depends